O. KRAUS.

COMBUSTION CHAMBER FOR GAS ENGINES.

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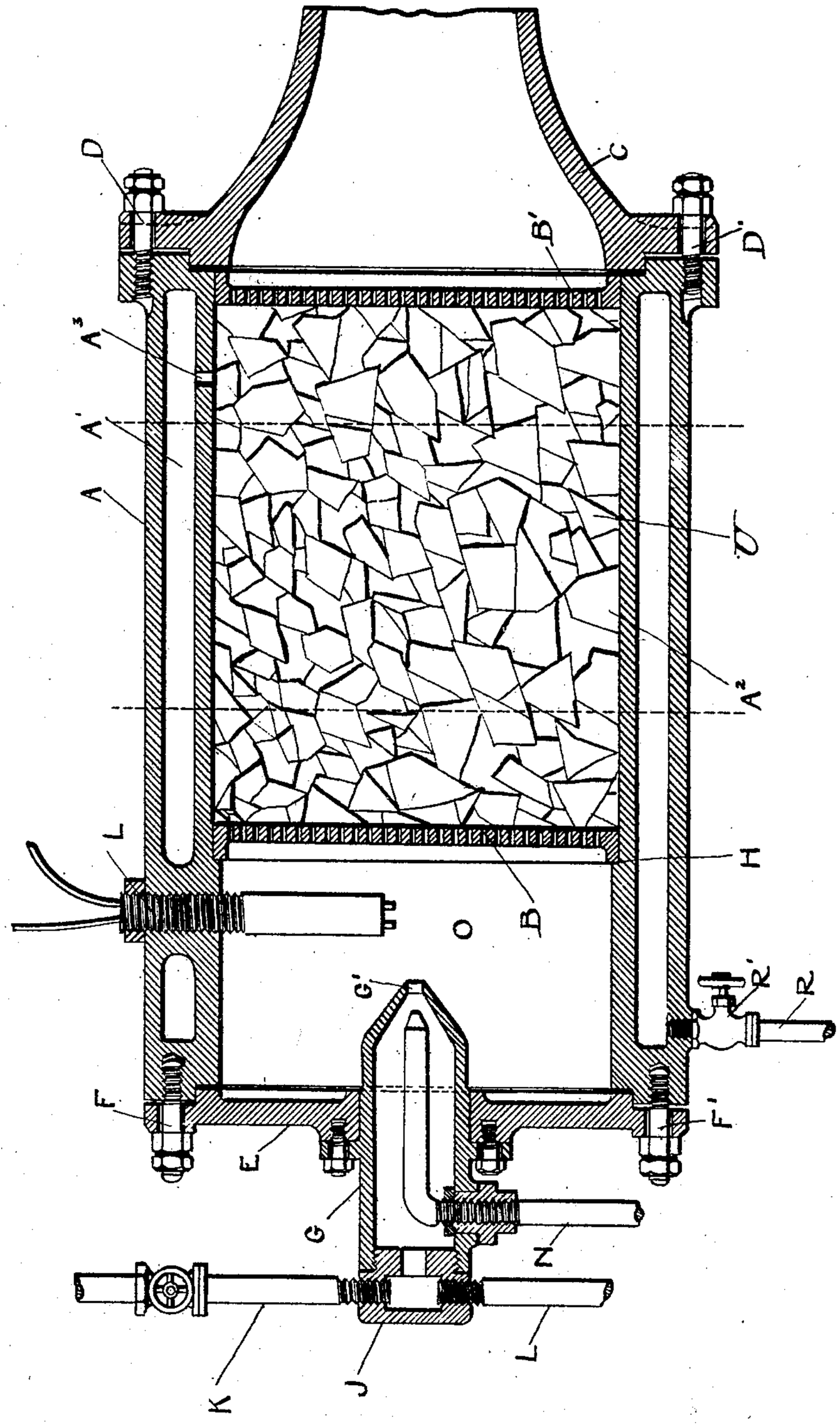
943,082. **Patented Dec. 14, 1909.**



Witnesses

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COMBUSTION-CHAMBER FOR GAS-ENGINES.

943,082. Specification of Letters Patent. Patented Dec. 14, 1909.

Application filed December 27, 1907. Serial No. 408,280.

To all whom it may concern:

Be it known that I, OTTO KRAUS, a citizen of the United States, residing at 169 West One Hundred and Thirty-sixth street, New York city, New York, have invented new and useful Improvements in Combustion-Chambers for Gas-Engines, of which the following is a specification.

The present invention relates to combustion chambers for use with continuous combustion engines of that type wherein the products of combustion are led from the combustion chamber to the working cylinders of an engine.

The object of the invention is to provide a combustion chamber in which the fuel will be completely burned and to control the temperature to prevent overheating of the casing and partitions located in the combustion chamber, and to utilize the cooling medium for power.

My invention is set forth in the accompanying drawing, which forms part of this specification.

In the drawing, I shows a longitudinal sectional view through the combustion chamber and feeding device in which A, indicates a casting of cylindrical form having an annular water chamber A′, and a combustion chamber A^2, in which are located two perforated partitions B and B′ respectively, between which is a bed of refractory material U, through the interstices of which the gases may pass from partition B to B′.

The perforated partition B, is located at a predetermined distance from the cover E, and thereby forms a chamber O, in which is located a spark plug L, for the purpose of igniting the fuel gases flowing to said chamber. The diameter of that portion of the combustion chamber in which the refractory material U is located is somewhat larger than that of the chamber O, and the perforated partition B, is inserted in position as shown, from the small end of the combustion chamber until it abuts against the shoulder H, formed by the reduced diameter of the chamber O. The refractory material is then inserted, and the perforated partition B′ is then placed in position as shown, the casting C abutting the edges of same to hold it in position. Said casting C, is connected to the chamber A, by stud bolts D and D′, and the small end or outlet is adapted for engagement with a pipe or the cylinder of an engine, as may be desired. The opposite end of the chamber A is provided with a cover E, which is removably secured thereto by stud bolts F and F′, as shown, and the center of the cover E is provided with an aperture in which is located an atomizer G, which is secured to the cover by bolts H, as shown. A hollow cap J, is secured to the portion H of the atomizer and connected thereto is a pipe K, through which compressed air is led to the atomizer. A pipe R, controlled by a valve R′, is connected to the casing A, and in communication with the chamber A′, and an outlet A^3 is provided, which leads within the chamber A^2.

The chamber A′ preferably extends the entire length of the combustion chamber, thereby completely surrounding the same, so that water forced into said chamber will serve as a water jacket to prevent the overheating of the walls of said combustion chamber. A pipe N, leads within and forms a part of the atomizer G, through which oil is supplied to said atomizer. The lower end of pipe L is closed by any suitable means, but may be extended, if desired, to a chamber in which the fuel oil is stored to conduct air from pipe K to the surface of the oil therein to force same through the pipe N to the atomizer G, as will be readily understood.

One of the most important points is to prevent the overheating of the perforated partitions B and B′, which may be made of cast iron or other suitable material, and I accomplish this as hereinafter set forth.

The operation is as follows: Assuming air under a pressure of 50 pounds per square inch to be flowing through pipe K and atomizer G, and oil to be flowing to the atomizer under the same pressure to pipe M and atomized in proper proportions into chamber O, the gases being ignited therein by the spark plug L, which may be continuously operated, the heat thus generated will soon raise the refractory material U in chamber A^2 to incandescence, and therefore, to prevent the heat from rising to a temperature sufficiently high to injure the perforated partitions B and B′ and the casing of the combustion chamber, water is forced to the chamber A through pipe R, by a pump or other suitable means, which serves to keep the casing A from becoming overheated, and the water

and steam flowing into the chamber U is mixed with the products of combustion and serves for power in the engine cylinder, and further by the steam or water entering at the proper distance from the perforated partition B′, the temperature of the same is reduced below the melting or fusing point of the material from which said partition B′ is constructed, thereby protecting same from injury, even though the refractory material near the center of the combustion chamber was heated to a temperature above that necessary to cause such injury. The partition B is protected by causing the major portion of the combustion of fuel gases to take place beyond same and within the interstices of the refractory material U, the heat generated in chamber O being below that of the temperature of the refractory material U, since the refractory material serves the function of accumulating the heat and by reaction raising the temperature between the vertical dotted lines, to a point much higher than that generated in the chamber O.

It is obvious that gaseous fuel may be fed direct through ~~pipe~~ K to chamber O, and the atomizer dispensed with. It will be understood that any desired pressure may be generated in the combustion chamber, limited only by the pressure at which the fuel is fed to the combustion chamber and the rapidity with which the gases generated thereby are drawn into the engine. In case the combustion chamber was disposed vertically, the top partition might be dispensed with, but is preferably used to prevent small pieces of refractory material from being carried into the engine, the water and steam generated serving to prevent the passage of small particles beyond this point. The refractory material U serves to hold the heat and to effect the perfect burning of the fuel gases, and in case the gas is shut off for an instant from flowing to the combustion chamber, the refractory material will still contain sufficient heat to again ignite the gases when they flow in contact therewith. The refractory material U is preferably formed of broken or uneven pieces of sufficient size so that the area formed by the interstices will be sufficient to allow the passage of the expanded gases through same to the outlet without undue friction.

Automatic means have been provided to maintain the proper ratio of water and steam delivered to the combustion chamber and the fuel gases fed thereto, but do not form a part of the present invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is—

A combustion chamber comprising an ignition chamber; a second chamber to hold comminuted refractory material having perforated retaining plates interposed across the path of the combusted material; a water jacket surrounding said second chamber; a passage between said water jacket and said second chamber, said passage located between the said retaining plates; suitable means to provide a continuous flow of water to said jacket; suitable means to provide a flow of fuel to said ignition chamber; and suitable conductors to convey the heated gas and vapors away.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this 17th day of December 1907.

OTTO KRAUS.

Witnesses:
FRANK M. ASHLEY,
ALBERT MENDELSOHN.